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(b) causing at least one random chemical reaction to take place with at least some of the different organic molecules in the reaction mixture to create a reaction mixture having one or more organic molecules different from the organic molecules in the starting group of the previous step;

D1 (c) repeating step (b) at least once by causing at least one random chemical reaction to take place with at least some of the organic molecules in the reaction mixture from the previous step or repetition to thereby produce a final reaction mixture as a result of the last repetition; and

(d) screening the final reaction mixture resulting from step (c) for the presence of the organic molecule having the desired property.

D2 10. (Amended) The method of claim 1 wherein the at least one of the random chemical reactions for each repetition of step (b) is independently selected from the group consisting of substitution, addition, elimination, rearrangement, dehydration, reduction, oxidation, condensation, hydrogenation, dehydrogenation, dimerization, epoxidation, isomerization, cyclization, decyclization, halogenation, sulfonation, alkylation, acylation, nitration, hydrolysis, esterification, transesterification, carboxylation, decarboxylation, amination, and deamination.

11. (Amended) The method of claim 1 wherein the random chemical reaction is caused by changing the conditions of the intermediate reaction mixture, by taking a step selected from the group consisting of adding water, removing water, adding air,

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D2
adding oxygen, adding ammonia, changing temperature, changing pressure, adding an oxidizing agent, adding a reducing agent, adding a source of radiation, adding a hydroxylating agent, adding a hydrogenating agent, adding a dehydrogenating agent, adding an epoxidizing agent, adding a halogenating agent, adding a sulfonating agent, adding an alkylating agent, adding an acylating agent, adding a nitrating agent, adding a hydrolytic agent, adding a carboxylating agent, adding a decarboxylating agent, changing concentration, adding a new solvent, changing pH, and adding a catalyst.

12. (Amended) The method of claim 1 wherein the at least one random chemical reaction is caused by adding a set of different enzymes.

D3
16. (Amended) The method of claim 1 wherein the conditions causing the random chemical reactions of steps (b) and (c) are the same.

25. (Amended) A method for the production of an organic molecule having a desired property, comprising the steps of:

D4
(a) providing a starting group of at least 100 different organic molecules selected from the group consisting of alkanes, alkenes, alkynes, arenes, alcohols, ethers, amines, aldehydes, ketones, acids, esters, amides, cyclic compounds, heterocyclic compounds, organometallic compounds, hetero-atom bearing compounds, amino acids, nucleotides, and mixtures thereof;

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(b) causing at least one random chemical reaction selected from the group consisting of substitution, addition, elimination, rearrangement, dehydration, reduction, oxidation, condensation, hydrogenation, dehydrogenation, dimerization, epoxidation, isomerization, cyclization, decyclization, halogenation, sulfonation, alkylation, acylation, nitration, hydrolysis, esterification, transesterification, carboxylation, decarboxylation, amination, and deamination to take place with at least some of the different organic molecules in the starting group to create an intermediate reaction mixture having one or more organic molecules different from the organic molecules in the starting group;

D4 (c) repeating step (b) at least once by substituting the intermediate reaction mixture as the starting group to thereby produce a final reaction mixture as a result of the last repetition;

(d) screening the final reaction mixture resulting from step (c) for the presence of the organic molecule having the desired property;

(e) isolating from the final reaction mixture the organic molecule having the desired property; and

(f) determining the structure or functional properties characterizing the organic molecule having the desired property.

D5 28. (Amended) The method of claim 27 wherein the at least one random chemical reaction is caused by adding a set of different enzymes.